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OVERVIEW OF MAJOR TOBACCO COMPANIES' PATENT
ACTIVITIES DURING THE YEARS 1975-1977

Susan A. Hutcheson
Patent Law Department
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COMPANY
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OVERVIEW OF MAJOR TOBACCO COMPANIES' PATENT ACTIVITIES DURING THE YEARS 1975-1977

I. INTRODUCTION

The object of this report is to present an overview of patent activity within major tobacco companies during the years 1975 through 1977. Issued or published patents may provide valuable information regarding the direction of research and development within individual companies. Frequently patents are virtually the only source of information regarding new developments within a company; in many instances the information is not published in technical or trade journals.

For ease of interpretation, the data are presented in two sections. The first section provides a detailed summary of U. S. patents issued to major tobacco companies in 1977. In addition, all patents issued for the years 1975-1977 are tabulated for comparative purposes in an attempt to more clearly illustrate possible patent trends within the individual companies.

The second section summarizes applications and/or patents issued or published in foreign countries for the year 1977. Foreign published applications or issued patents frequently appear prior to U. S. patents and are, therefore, a valuable indicator of new developments. Moreover, in some instances the foreign applications or patents may never issue in the U. S. due to the fact that the subject matter is not patentable under present U. S. patent laws. There is some difficulty involved in obtaining information regarding foreign applications and patents. In some instances it is difficult to determine the exact date of publication or issue; therefore, some of the material cited may possibly have appeared abroad in late 1976 or early 1978. An attempt will be made to identify those applications

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that have been filed in a large number of countries. Generally, extensive filing is indicative of the importance of the invention.

A number of sources were used in preparing this report, and it was noted that data pertaining to foreign applications and/or patents differed slightly in some instances depending on the source used. An attempt has been made to report the data accurately as shown in the various sources. None of the sources used to obtain foreign information were considered to be absolutely complete. Many countries, particularly the South American countries and the USSR, are poorly represented in all data bases used.

Sources used include the following:

1. Philip Morris Domestic and Foreign Patent Files
2. World Patent Index
3. IFI Assignee Index to U. S. Patents 1975-1977
4. INPADOC Data Base
5. International Patent Research Office Publications
6. U. S. Official Gazette

The INPPDOC Data Base provided the most comprehensive data including priority country and dates. Many small, relatively obscure countries are not represented by any of the commercially available data bases.

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II. MAJOR TOBACCO COMPANIES' U. S. PATENT ACTIVITIES

A. Philip Morris Incorporated--U. S. Patents 1975-1977

| <u>Year</u> | <u>Number Issued</u> | <u>Percent R&D</u> |
|-------------|----------------------|------------------------|
| 1975 | 8 | 62 |
| 1976 | 12 | 33 |
| 1977 | 18 | 72 |

Tables I and II illustrate several interesting trends with respect to Philip Morris patents issued during 1975-1977. The incidence of Class 131 patents issued to the R&D division has increased dramatically since 1975 when only one Class 131 patent issued. Class 131 patents pertain specifically to tobacco related inventions and include tobacco filters, tobacco substitutes, tobacco processing, flavoring, and the like. In 1976 there were three and in 1977 there were seven Class 131 patents. In 1975 R&D received five or 62 percent of all patents issued to Philip Morris; in 1976 R&D had four or 33 percent of all patents issued; and in 1977 R&D received 13 or 72 percent of all patents issued.

It would appear that apparatus and/or various mechanically oriented inventions have predominated patent efforts at Philip Morris. For example, in 1975, 50 percent of the patents issued related to mechanical inventions; in 1976, 75 percent were mechanically related; and in 1977, 55 percent were of a mechanical nature.

Menthol-release compounds appeared in 1975 and 1977, and additional flavor-release patents will issue in 1978. Philip Morris appears to be leading the field in innovative flavor release systems for smoking products. Class 131 patents are so varied that it is difficult to identify particular trends within R&D; however, Class 131 patents appear to be increasing in number. Tobacco substitutes and/or extenders (Class 131/2) and modified and/or improved filters (Class 131/10) appear to be of some interest.

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B. R. J. REYNOLDS TOBACCO CORPORATION--U. S. PATENTS 1975-1977

Patents granted to R. J. Reynolds (Reynolds Leasing Corporation) during 1977 are listed in Table III while Table IV tabulates all patents granted during 1975-1977. Patents issued in 1975 to R. J. Reynolds appear to be of minor consequence. The year 1976, however, proved to be the year of the "puffed grain" cigarette. Grains of every type imaginable are puffed and thereafter added to tobacco as "extenders," or they may be used as tobacco substitutes. It is interesting to note that the first set of issued patents were classified in 131/2 (tobacco substitutes) whereas the second set were classified in 131/17R (tobacco compositions).

Another interesting trend noted in 1976-1977 is the issuance of a number of patents related to microbial-enzymatic processes in Class 195. Specifically, the patents disclose various methods wherein microbial cells having active enzymes are subjected to flocculation conditions to produce whole cell aggregates that are useful in effecting enzyme-catalyzed chemical transformations. Methods for the isomerization of glucose to fructose utilizing microorganisms are disclosed. Although the patents are assigned to R. J. Reynolds, no disclosure of utility in tobacco or specific flavor reactions for tobacco is suggested. Possibly the Class 195 patents originated from R. J. Reynolds Foods; however, this is impossible to determine from the available information.

Although R. J. Reynolds has published extensively concerning their research in the area of tobacco smoke constituents, many of which are desirable flavor additives, little apparent attempt has been made to patent the isolated compounds as tobacco flavorants. In 1977 only one flavor patent was issued to R. J. Reynolds. A separate search of Aromatics International failed to uncover additional patents.

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C. BROWN & WILLIAMSON TOBACCO CORPORATION--U. S. PATENTS 1975-1977

Tables V and VI tabulate patents issued to Brown & Williamson for the year 1977 and 1975-1977 respectively. Brown & Williamson received a variety of filter patents in the past three years and the ventilated filter patents in 1975 have probably generated the most interest. Several of the other filter patents disclose a variety of additives for selective filtration and include amine resins, carbon, and the like. In 1975 over 50 percent of Brown & Williamson's patents were filter related; however, in 1977 only 26 percent of the patents issued disclosed various filters or apparatus for making filters.

Nine Class 131 patents issued in both 1975 and 1977, and there were five in 1976. Methods for reinforcing, stabilizing, or stiffening tobacco structures appear to be of interest; and various additives such as methyl cellulose have been utilized to accomplish this.

Enzymatic and/or microbial treatment of tobacco is evident in 1976 and 1977. U. S. Patent 3,974,838 discloses a method for treating uncured tobacco with enzymes which convert the starch content in tobacco to sugars. In 1977 several patents issued that disclose methods for the denicotinization of tobacco via microorganisms. Tobacco is subjected, under controlled conditions, to microorganisms effective to degrade nicotine through biochemical reactions in which 3-succinoylpyridine is subsequently formed. It is interesting to note that, to date, this method has been filed only in West Germany and no other foreign equivalents have been found.

D. LIGGETT GROUP, INCORPORATED--U. S. PATENTS 1975-1977

The most obvious trend noted in Tables VII and VIII for issued Liggett patents is in the area of filter development. In 1975 one filter-related patent issued, and in 1977 there were six or 75 percent of the total patents issued that disclosed filters or apparatus for making a variety of filter configurations. Of particular interest is U. S. 4,037,524, which discloses a filter having a hollow

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polyethylene tube embedded longitudinally therein. Currently this filter configuration is being used in such products as Decade and L&M Flavor Lights. Filters produced according to this patent have a plastic tube disposed at one end only of the filter whereas the U. S. 3,860,011 (1975) patent discloses a hollow tube extending longitudinally through the entire length of the filter. Advertisements allude to the fact that this is a "flavor tube" that delivers increased flavor impact, particularly in lower delivery cigarettes.

E. LORILLARD (LOEWS THEATRES, INCORPORATED)

In 1977 Lorillard received one patent--U. S. 3,036,380, Apparatus for Opening Cigarette Cartons and Packs and Removing the Cigarettes, Class 214/305. No patents were issued to Lorillard during 1975-1976.

F. AMERICAN BRANDS

Table IX lists the four patents issued to American Brands in 1977; however, the table for 1975-1977 is omitted from this section since no U. S. patents were issued to American Brands in 1976, and only one patent--U. S. 3,925,904, "Method and Apparatus for Drying Stillage," Class 34/10--was issued in 1975.

Very little can be said regarding patent trends at American Brands since their patent activity has been so limited in recent years. Processes for expanding tobacco, however, appear to be an area of particular interest to American Brands at this time.

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TABLE I

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U. S. PATENTS ISSUED TO PHILIP MORRIS INCORPORATED IN 1977*

| Patent No. | Class | Title | Division |
|------------|------------|---|---------------|
| 4,054,020 | 53/128 | Apparatus for Inserting Spacer Members Between Two Upright Articles | Engineering |
| 4,047,421 | 73/1R | Apparatus for Calibrating Cigarette Inspection Device | Engineering |
| 4,019,366 | 73/23 | Variable Parameter Smoking Machine | R&D |
| 4,015,514 | 93/1C | Apparatus for Making Cigarette Filters | R&D |
| 4,019,521 | 131/2 | Smokable Material and Method for Preparing Same (Tobacco Substitutes, Thermal Degradation) | Consultant |
| 4,034,764 | 131/2 | Smoking Material and Method for Its Preparation (Film-Forming Carbohydrate and Ozone Treatment) | R&D |
| 4,002,177 | 131/10R | Microporous Styrene Polymers and Method of Making Same (Filter for Tobacco Product) | R&D |
| 4,022,223 | 131/10.9 | Smoking Article (Metal Salt-Amine Complex as Filter Element) | R&D |
| 4,002,179 | 131/17A | Smoking Compositions Incorporating a Menthol-Release Agent | R&D |
| 4,036,237 | 131/17R | Smoking Composition (β -Hydroxy Esters as Source of Flavor or Aroma) | R&D |
| 4,033,360 | 131/21B | Apparatus Providing Output Indication of Tobacco Rod Firmness | R&D |
| 4,005,668 | 141/67 | Material Transfer Method and Apparatus | R&D |
| 4,019,942 | 156/180 | Maintaining Plasticizer Temperature in Tobacco Filter Rod Formation and Apparatus Therefor | Engineering |
| 4,063,641 | 206/484 | Two-Side Legible Packaging Film and Package Made Therefrom | PM Industrial |
| 4,039,795 | 219/10.55A | Apparatus for Transporting Material for Treatment in a Microwave Unit | R&D |
| 4,035,125 | 425/141 | Jam Prevention Unit for Extrusion Process | R&D |
| 4,065,239 | 425/141 | Jam Prevention Device for Extrusion Process | R&D |
| 4,025,671 | 427/286 | Method for Applying Continuous Longitudinal Bands of Liquid Coating to a Moving Strip | R&D |

*ASR patents not included

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TABLE II

U. S. PATENTS ISSUED TO PHILIP MORRIS INCORPORATED FROM 1975 THROUGH 1977

| 1975 | | | | 1976 | | | | 1977 | | | |
|------------|---------|-------------------------|-------------|------------|----------|------------------------|-------------|------------|-----------|--------------------------|---------------|
| Patent No. | Class | Subject | Division | Patent No. | Class | Subject | Division | Patent No. | Class | Subject | Division |
| 3,874,030 | 19/65T | Spreading tow apparatus | R&D | 3,991,458 | 29/234 | Apparatus | Engineering | 4,054,020 | 53/128 | Apparatus | Engineering |
| 3,871,059 | 29/427 | Vending machine | Mfg. Eng. | 3,949,646 | 91/461 | Air cylinder device | Engineering | 4,047,421 | 73/1R | Calibrating apparatus | Engineering |
| 3,925,891 | 30/362 | Punch mechanism | Engineering | 3,987,727 | 101/366 | Apparatus printing ink | Mfg. Eng. | 4,019,366 | 73/23 | Smoking machine | R&D |
| 3,911,932 | 131/158 | Porous paper | R&D | 3,976,053 | 128/2.08 | Respiration apparatus | Consultant | 4,015,514 | 93/1C | Apparatus filters | R&D |
| 3,870,070 | 137/512 | Air system control | Engineering | 3,977,417 | 131/10.9 | Organic oil filter | R&D | 4,019,521 | 131/2 | Tobacco substitute | Consultant |
| 3,909,455 | 252/466 | Catalyst | R&D | 3,957,059 | 131/10R | Selective filter | R&D | 4,034,764 | 131/2 | Tobacco substitute | R&D |
| 3,887,603 | 260/463 | Menthol release | R&D | 3,982,550 | 131/140P | Tobacco expansion | R&D | 4,002,177 | 131/10R | Styrene polymers-filter | R&D |
| 3,887,730 | 427/244 | Styrene polymers | R&D | 3,942,623 | 198/32 | Multi-lane conveyor | Engineering | 4,022,223 | 131/10.9 | Selective filter | R&D |
| | | | | 3,955,060 | 219/10 | Microwave oven | R&D | 4,002,179 | 131/17A | Menthol release | R&D |
| | | | | 3,952,185 | 235/151 | Apparatus | Mfg. Eng. | 4,036,237 | 131/17R | Flavorants | R&D |
| | | | | 3,967,858 | 302/2R | Filter rod apparatus | Engineering | 4,033,360 | 131/21B | Apparatus rod firmness | R&D |
| | | | | 3,995,910 | 302/2R | Rod transfer apparatus | Engineering | 4,005,668 | 141/67 | Material transfer | R&D |
| | | | | | | | | 4,019,942 | 156/180 | Apparatus filter rod | Engineering |
| | | | | | | | | 4,063,641 | 206/484 | Packaging film | PM Industrial |
| | | | | | | | | 4,039,795 | 219/10.55 | Transport apparatus | R&D |
| | | | | | | | | 4,035,125 | 425/141 | Jam prevention | R&D |
| | | | | | | | | 4,065,239 | 425/141 | Jam prevention | R&D |
| | | | | | | | | 4,025,671 | 427/286 | Method of liquid coating | R&D |

NOTE: Class 131 patents are of particular interest in that they pertain to tobacco processes, tobacco flavorants, tobacco substitutes, and all other subjects directly related to smoking articles. Filter patents fall in this classification also if specifically claimed for use in smoking articles.

TABLE III

U. S. PATENTS ISSUED TO R. J. REYNOLDS TOBACCO CORPORATION IN 1977

| Patent No. | Class | Title |
|------------|---------|---|
| 4,056,108 | 131/17 | Tobacco Product--Imidazole or Benzimidazole, Flavor Enhancers |
| 4,020,852 | 131/94 | Apparatus for Applying Uniting Bands to Co-Axial Rod Shaped Articles |
| Re 29,130* | 195/31 | Enzymatic Process Using Immobilized Microbial Cells/Polyelectrolyte Flocculant |
| 4,060,456 | 195/31 | Glucose Isomerization Process (Conversion to Fructose with Glucose Isomerase, Polyelectrolyte Flucculant) |
| 4,061,539 | 195/31 | Preparation and Use of Glucose Isomerase--From Flavobacterium Arborescens |
| Re 29,136* | 195/116 | Enzymatic Process Using Immobilized Microbial Cells |
| 4,062,367 | 131/134 | Tiered Container with Flow Distribution System (Reynolds Leasing Corporation) |

*Reissue patents of U. S. 3,821,086 issued 28 June 1974

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TABLE IV

U. S. PATENTS ISSUED TO R. J. REYNOLDS TOBACCO CORPORATION FROM 1975 THROUGH 1977

| 1975 | | | 1976 | | | 1977 | | |
|------------|---------|-------------------------------|------------|---------|-------------------|------------|---------|---------------------------------|
| Patent No. | Class | Subject | Patent No. | Class | Subject | Patent No. | Class | Subject |
| 3,882,874 | 131/146 | Expansion--dicarboxylic acids | 3,977,412 | 131/2 | Puffed triticales | 4,056,108 | 131/17 | Flavorant |
| 3,868,289 | 156/443 | Apparatus--filters | 3,977,413 | 131/2 | Puffed barley | 4,020,852 | 131/94 | Filter apparatus |
| 3,863,756 | 198/220 | Conveyor | 3,977,414 | 131/2 | Puffed oats | 4,060,456 | 195/31 | Enzyme-microbial |
| 3,858,788 | 299/44 | Flip-top box | 3,977,415 | 131/2 | Puffed rye | 4,061,539 | 195/31 | Enzyme-microbial |
| | | | 3,978,866 | 131/2 | Peanut shells | 4,062,367 | 131/134 | Apparatus for tobacco expansion |
| | | | 3,996,940 | 131/17R | Flavorant | RE 29,130 | 195/31 | Enzyme-microbial |
| | | | 3,996,941 | 131/17R | Flavorant | Re 29,136 | 195/116 | Enzyme-microbial |
| | | | 3,964,494 | 131/17R | Puffed milo | | | |
| | | | 3,964,495 | 131/17R | Puffed corn | | | |
| | | | 3,964,496 | 131/17R | Puffed rice | | | |
| | | | 3,964,497 | 131/17R | Puffed wheat | | | |
| | | | 3,964,498 | 131/17R | Puffed millet | | | |
| | | | 3,935,068 | 195/31F | Enzyme-microbial | | | |
| | | | 3,935,069 | 195/31F | Enzyme-microbial | | | |
| | | | 3,989,596 | 195/56 | Enzyme-microbial | | | |
| | | | 3,989,597 | 195/56 | Enzyme-microbial | | | |
| | | | 3,937,710 | 260/297 | Pharmaceutical | | | |

TABLE V

U. S. PATENTS ISSUED TO BROWN & WILLIAMSON TOBACCO CORPORATION IN 1977

| Patent No. | Class | Title |
|------------|---------|--|
| 4,036,114 | 93/1 | Apparatus for Cigarette Filter Manufacture |
| 4,056,047 | 93/49 | Method and Apparatus for Assembling a Package |
| 4,033,283 | 118/1 | Apparatus for Interacting with Articles Passing Therethrough |
| 4,016,830 | 118/406 | Apparatus for Dispensing Spaced Deposits of Particulate Material |
| 4,019,520 | 131/2 | Tobacco Substitute Containing Boric Oxide, Boron Oxyacids, and Ammonium, Alkali Metal, or Alkaline Earth Metal Salts of Boron Oxyacids |
| 4,020,850 | 131/15 | Thermoplastic Cigarette Wrapper--Finely Divided Paper, KNO_3 , Whitener, Cellulose Ester, or Ether Binder |
| 4,009,723 | 131/84 | Method for Cutting a Tobacco Product Rod and Increasing the End Strength Thereof |
| 4,000,748 | 131/140 | Apparatus and Process for Shredding and Crimping Smoking Materials |
| 4,034,766 | 131/140 | Reinforcement of Tobacco Structure--Methyl Cellulose |
| 4,037,609 | 131/141 | Process for the Reduction of Nicotine Content of Tobacco by Microbial Treatment |
| 4,038,993 | 131/141 | Process for Reduction of Nicotine Content of Tobacco by Microbial Treatment |
| Re 29,298 | 131/144 | Deposition of Vaporized Flavorant on Tobacco |
| 4,033,361 | 131/262 | Tobacco Smoke Filter--Adsorbent Amine-Type Anion Exchange Resin |
| 4,062,368 | 131/265 | Tobacco Smoke Filters--Carbon |
| 4,035,220 | 156/291 | Method for Making Porous Filter Tip for Tobacco Products |
| 4,011,141 | 195/96 | Process for Maximizing the Growth and Nicotine Degrading Activity of Microorganisms |
| 4,097,117 | 206/270 | Package Having a Slide Actuated Closure Member |
| 4,006,824 | 211/49 | Display and Dispensing Stand |
| 4,034,868 | 214/8 | Apparatus for Extracting Contents of a Package |

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TABLE VI

U. S. PATENTS ISSUED TO BROWN & WILLIAMSON TOBACCO CORPORATION FROM 1975 THROUGH 1977

| 1975 | | | 1976 | | | 1977 | | |
|------------|----------|----------------------------|------------------------|---------|-----------------------------------|------------------------|---------|--------------------------------|
| Patent No. | Class | Subject | Patent No. | Class | Subject | Patent No. | Class | Subject |
| 3,910,166 | 93/1C | Filter apparatus | 3,943,832 | 93/1C | Apparatus + filter | 4,036,114 | 93/1 | Apparatus + filter |
| 3,915,075 | 93/1C | Filter + extruded | 3,943,835 | 93/77 | Filter wrap | 4,056,047 | 93/49 | Apparatus + package |
| 3,859,110 | 117/27 | Surface finishes embossing | 3,957,060 | 131/17R | Urea or biuret + tobacco-impact | 4,033,283 | 118/1 | Apparatus + articles |
| 3,863,644 | 131/9 | Controlled cigarette | 3,974,838 | 131/17R | Uncured tobacco + enzymes | 4,016,830 | 118/406 | Apparatus + filter |
| 3,900,037 | 131/10 | Filter | 3,948,275 | 131/17R | Stabilization of expanded tobacco | 4,019,520 | 131/2 | Tobacco substitute |
| 3,916,914 | 131/10A | Ventilated filter | 3,970,091 | 131/122 | Cyrogenic threshing | 4,020,850 | 131/15 | Thermoplastic wrapper |
| 3,924,643 | 131/10A | Filter wrap ventilated | 3,991,771 | 131/134 | Apparatus for flavor application | 4,009,723 | 131/84 | Cutting method for rod |
| 3,910,288 | 131/10.5 | Programmed filter | 3,957,563 | 156/438 | Apparatus + filter | 4,000,748 | 131/140 | Shredding + crimping tobacco |
| 3,808,671 | 131/15R | Thermoplastic wrapper | 3,977,520 | 206/270 | Flip top box | 4,034,766 | 131/140 | Reinforced tobacco |
| 3,870,053 | 131/121 | Flavor + microwave | 3,991,892 | 214/152 | Extracting content of package | 4,037,609 | 131/141 | Tobacco + microorganisms |
| 3,880,171 | 131/84 | Apparatus--cigarette maker | Re 28,858 ¹ | 131/267 | Selective gas phase filter | 4,038,993 | 131/141 | Tobacco + microorganisms |
| 3,894,545 | 131/261B | Filter | | | | 4,033,361 | 131/262 | Filter--amine resin |
| 3,884,741 | 156/259 | Filter | | | | 4,062,368 | 131/265 | Filter--carbon |
| 3,881,599 | 206/273 | Cigarette package | | | | 4,035,220 | 156/291 | Porous filter tip |
| 3,863,990 | 302/28 | Apparatus--rod-maker | | | | 4,011,141 | 195/96 | Microorganisms |
| | | | | | | 4,097,117 | 206/270 | Package--slide closure |
| | | | | | | 4,006,824 | 211/49 | Display stand |
| | | | | | | 4,034,868 | 214/8 | Extracting contents of package |
| | | | | | | Re 29,298 ² | 131/144 | Deposition of flavorant |

¹Reissue 28,858 of U. S. 3,716,063²Reissue 29,298 of U. S. 3,800,806

TABLE VII

U. S. PATENTS ISSUED TO LIGGETT GROUP, INCORPORATED IN 1977

| Patent No. | Class | Title |
|------------|---------|--|
| 4,037,524 | 93/77 | Apparatus for Combining a Tube with a Cigarette Filter |
| 4,063,494 | 93/77 | Apparatus for Making Filter Rods for Cigarettes |
| 4,052,993 | 131/9 | Cinnamic Derivatives as Tobacco Additives |
| 4,055,191 | 131/9 | Tobacco Composition-Palladium, Inorganic Nitrate |
| 4,023,576 | 131/10 | Cigarette Mouthpiece for Controlling Flow |
| 4,034,765 | 131/10 | Tobacco Smoke Filter--Cellulose Acetate |
| 4,024,013 | 156/441 | Method and Apparatus for Making a Hollow Filter and a Filter Rod |
| 4,063,633 | 198/455 | Vacuum Plug Feed Machine |

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TABLE VIII

U. S. PATENTS ISSUED TO LIGGETT GROUP, INCORPORATED FROM 1975 THROUGH 1977

| 1975 | | | 1976 | | | 1977 | | |
|------------|----------|------------------------------|------------|---------|------------------------|------------|---------|----------------------|
| Patent No. | Class | Subject | Patent No. | Class | Subject | Patent No. | Class | Subject |
| 3,860,011 | 131/10.5 | Hollow filter | 3,943,943 | 131/17R | Flavorants | 4,037,524 | 93/77 | Filter--apparatus |
| 3,878,851 | 131/17 | Tobacco casing | 3,976,085 | 131/25 | Cigarette feed machine | 4,063,494 | 93/77 | Filter apparatus |
| 3,893,464 | 131/17R | ZnOxide--nitrate additive | 3,949,107 | 427 | Floor polishing method | 4,052,993 | 131/9 | Flavorant |
| 3,920,026 | 131/17R | Flavor reaction additive | | | | 4,055,191 | 131/9 | Tobacco additive |
| 3,878,852 | 131/28 | Cigarette transfer apparatus | | | | 4,023,576 | 131/10 | Mouthpiece |
| 3,923,146 | 198/37 | Tobacco harvester | | | | 4,034,765 | 131/10 | Filter |
| 3,902,607 | 214/5.5 | Cigarette transfer apparatus | | | | 4,024,012 | 156/441 | Filter and apparatus |
| 3,900,521 | 260/592 | Chocolate flavor | | | | 4,063,633 | 198/455 | Apparatus |

TABLE IX

| U. S. PATENTS ISSUED TO AMERICAN BRANDS IN 1977 | | |
|---|---------|--|
| Patent No. | Class | Title |
| 4,044,528 | 53/193 | Method and Apparatus for Forming Sealed Packages |
| 4,044,780 | 131/135 | Apparatus for Total Blend Expansion |
| 4,040,431 | 131/140 | Method of Increasing the Filling Capacity of Shredded Tobacco Tissue |
| 4,024,956 | 209/73 | Method and Apparatus for Detecting Leaks |

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III. MAJOR TOBACCO COMPANIES' FOREIGN PATENT ACTIVITIES

A. Introduction

Over the past few years the importance of patent literature to industrial research and development has changed fundamentally. Before the 1970s, patent documents reflected the state of the art with a three-to four-year delay due to slow examination in the respective patent offices. In recent years, however, several foreign offices have started to publish unexamined applications within 18 months after filing, which has made patent literature a timely form of technical information. Countries that publish early include Belgium, France, Germany, Japan, the Netherlands, Portugal, South Africa, and the Scandinavian countries.

Because of the voluminous data accumulated on foreign activity of the major tobacco countries, it was necessary to limit the report to applications and/or patents published or issued in late 1976 through early 1978. It should be noted that in many instances applications filed widely may have been published earlier in those countries noted above; however, no attempt has been made to list every country in which an application has been filed.

Comprehensive information regarding most of the countries in which a specific application has been filed may be obtained on request. The INPADOC data base provides up-to-date information on approximately 45 countries at this time, thus making it possible to obtain a wide range of information regarding the activity of a particular company.

B. Philip Morris Incorporated--Foreign Patent Activity

Applications ranging approximately from PM 346 (filed 26 November 1962) to PM 693 (filed 4 November 1975) are presently being prosecuted in foreign countries. It should be noted that cases having a PM number higher than 693 have been filed abroad and may have been published; however, specific data is not available at this time.

The listing of Philip Morris foreign information includes only those applications published or issued in late 1976 through early 1978 although extensive filing may have taken place. This is

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particularly true in such cases as PM 620, which was filed in 43 countries. A complete listing of all countries in which a specific application has been filed is available on request.

Fourteen patents or publications relating to tobacco expansion, smoking substitutes, flavoring, and menthol release compositions and approximately 20 filter related, mechanical, and miscellaneous patents or publications appeared in the past year.

A review of many of the older applications, for example, those filed ten or more years ago, might be in order to determine if they are still potentially valuable to the company.

C. R. J. Reynolds Tobacco Corporation--Foreign Patent Activity

Many of R. J. Reynolds foreign filed cases have issued in the United States; therefore, there were few "surprises." Applications for "Tiered Container with Flow Distribution System" were published in 11 countries in 1977. These applications are assigned to Reynolds Leasing Corporation. Two applications relating to filters and apparatus for making them were filed rather widely but have not issued in the U. S. to date. One tobacco expansion process filed in the U. S. in 1971 has been published or issued widely.

British Patent 1,501,152 relies on nine U. S. applications that disclose the "puffed cereal" tobacco substitutes that appeared in 1976 in the U. S. The French and German equivalents of British 1,501,152 were published in 1976 and 1975 respectively.

D. Brown & Williamson Tobacco Corporation--Foreign Patent Activity

The data presented in this report is a combination of all foreign applications and patents originating from either Brown & Williamson or British American Tobacco Company (B.A.T.). In most instances, those applications originating from Brown & Williamson have a U. S. priority date and those from B.A.T. have Great Britain priorities.

Some of the most recently filed applications of B.A.T. have not issued in the U. S. to date. Most of the applications pertain to various filter modifications, for example, filters with helical channels

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for CO reduction, grooved filter elements, and charcoal filters with ventilated tipping paper. Of particular interest are the applications relating to highly porous paper or wrappers, some of which are perforated electrostatically by laser. A similar patent for "Cigarette with Highly Porous Paper" has just recently issued in the U. S. Apparently there was very limited filing on the cases pertaining to microbial denicotinization.

In summarizing, it would appear that filter development continues to have top priority status at Brown & Williamson/B.A.T., evidenced by the enormous number of applications filed. Tobacco related patents such as tobacco treatment, flavorants, substitutes, and the like continue to be of particular interest also.

E. Liggett Group, Incorporated--Foreign Patent Activity

A fairly comprehensive listing of Liggett's recent foreign patent activity is shown in Table XIII. Since Philip Morris has purchased certain of Liggett's foreign patents, a more complete listing of issued/published applications seemed appropriate. Unfortunately, a list of the exact patents acquired by Philip Morris is not available at this time.

Twenty-one cases relying on U. S. filing dates are listed. Of the twenty-one, seven relate generally to apparatus or devices, five relate to tobacco compositions generally with respect to a variety of chemical additives to modify total particulate matter, five relate to flavorants, and four relate to filters and methods for making them. Included in the filter patents are thirteen citations for a Liggett filter having a hollow plastic tube embedded longitudinally in the filter. Flavor patents of interest include cinnamic derivatives, mono and dialkyl malonates, and reaction flavors resulting from the combination of amino acids and sugars. Whether the flavor patents are part of the "total package" remains to be determined.

Additives for tobacco include palladium and inorganic nitrates, zinc oxide or zinc oxide and nitrate combinations. Although

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these additives may lower certain constituents in tobacco smoke, the use of additional nitrates would appear contrary to Philip Morris's continuing effort to reduce nitrate present in tobacco.

According to the INPADOC listing, there has been very limited foreign filing by Liggett after about 1974. This coincides fairly well with their U. S. filings for the corresponding dates.

F. and G. Lorillard and American Brands--Foreign Patent Activity

Due to the limited patent activities of Lorillard and American Brands, an in-depth analysis of their foreign filings was not made. Tables XIV and XV list respectively the foreign applications of Lorillard and American Brands. Undoubtedly, there are more cases pending and this information can be obtained if necessary.

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TABLE X

*U. S. Equivalent Issued

PHILIP MORRIS INCORPORATED

| Title and Inventor(s) | PM No. Priority | Publication or Issue Date | Country of Issue | Issue Number |
|---|--------------------------------|--|--|---|
| "Tobacco Foil" Hind, Seligman | 01/16/62 11/26/62 PM 346 | 12/29/77 | West German A. ¹ | 1517305 |
| "Polyoxl Carbon Filter"* Westbrook | 02/24/65 PM 428 | 05/26/77 | West German P. ² | 1692927 |
| "Sliced Puffed Stems" de la Burde | 12/17/65 PM 456 | 12/24/77 | Japan | 892506 |
| "Cigarette Ventilation"* Osmalov et al. | 04/20/67 PM 495 | 08/16/77 | Netherlands | 152748 |
| "Method for Forming Plastic Tubing"* Gatto | 07/24/68 PM 506A | 08/10/77 07/20/77 | Japan Norway | 876433 136079 |
| "Formed Plastic Rod for Filters"* Thomson et al. | 07/24/68 PM 506B | 09/23/77 06/10/77 10/10/77 02/16/77 09/22/77 | Mexico (DIV) Finland Denmark Netherlands Spain (DIV) | 136624 52014 135404 150998 166889 |
| "Smoking Article with Improved Filter"* Johnson et al. | 03/21/68 PM 507 | 02/28/77 | Finland | 52013 |
| "Reconstituted Tobacco"* Deszyck | 01/06/71 PM 524 | 10/13/77 | West German O. ³ (DIV) | 2265372 |

TABLE X (continued)

Philip Morris

| | | | | |
|---|--------------------|--|---|--|
| "Smoking Product"* Hind et al. | 08/13/70 PM 538 | 12/01/77 | Sweden | 395598 |
| "Microporous Structure and Method for Making"* Rainer et al. | 08/10/70 PM 546 | 07/15/77 | Switzerland | 589682 |
| "Oxygen Responsive Electrical Current Supply"* Lilly et al. | 11/20/69 PM 549 | 09/30/77 | Japan | 884728 |
| "Cyclopropyl Cyclohexanes"* Comes | 06/15/70 PM 564 | 04/15/77 | USSR | 554808 |
| "Improved Catalyst"* Rainer et al. | 05/01/73 PM 585 | 06/21/77 03/09/77 06/15/77 02/25/77 | Canada Great Britain Switzerland Japan | 1012527 1445394 588889 899521 |
| "Foam Wall Filter Rod" Mathe et al. | 08/21/72 PM 586 | 10/28/77 | Hong Kong | 532/77 |
| "Smoking Article" Hind et al. | 06/22/73 PM 588 | 05/13/77 10/04/77 04/27/77 04/29/77 | Australia Canada Great Britain Switzerland | 479929 1018420 1471943 587029 |
| "Expanding Tobacco (Microwave)"* Laszlo | 01/22/73 PM 594 | 12/16/77 02/10/78 | France West German P. | 2214420 2402658 |
| "Smoking Product and Process"* Rainer et al. | 02/10/75 PM 598 | 09/02/77 08/04/77 | Venezuela Australia | 35680 10693/76 |
| "Jam Prevention Unit for Extrusion"* Gergely | 01/22/73 PM 599 | 02/08/77 02/21/77 10/27/77 | Canada France West German P. | 1004816 2214578 2402657 |

TABLE X (continued)

Philip Morris

| | | | | |
|--|--------------------|--|--|---|
| "Menthol Release Compounds"* Rundberg et al. | 07/30/73 PM 602 | 12/15/77 | Switzerland | 593635 |
| "Process for Expanding Tobacco"* de la Burde et al. | 06/05/75 PM 616 | 11/15/77 01/18/77 | Switzerland Brazil | 597773 76/03610 |
| "Process of Expanding Tobacco"* (Interference--U. S.) de la Burde et al. | 02/12/74 PM 620 | 07/12/77 08/31/77 10/28/77 02/28/77 03/31/77 07/04/77 11/24/77 | Canada Ecuador France Spain (DIV) Switzerland West Germany Great Britain | 1013640 205 2260301 447755 587615 2446899 1444309 |
| "Apparatus for Transporting Materials to Microwave Oven"* Laszlo et al. | 09/16/74 PM 621 | 10/26/77 | Great Britain | 1490027 |
| "Process for Incorporating Organic Molecules into Cellulosic Material" Rainer et al. | 04/07/76 PM 625 | 10/20/77 | West German O. | 2715469 |
| "Ozone Treated Smoking Material"* Rainer et al. | 08/15/75 PM 626 | 02/17/77 | West German O. | 2636597 |
| "Material Transfer Apparatus"* Washington et al. | 06/09/75 PM 633 | 10/14/77 12/16/76 01/07/77 | Venezuela West German O. France (Appl.) | 35866 2625611 2313877 |
| "Cigarette Filter Rod Transfer Apparatus"* Atwell et al. | 11/27/74 PM 639 | 06/29/77 | Great Britain | 1477788 |
| "Apparatus for Making Cigarette Filters"* Nichols | 01/29/76 PM 648 | 08/04/77 08/11/77 08/02/77 08/26/77 | West German O. Japan Kokai Netherlands France (Appl.) | 2703556 52095484 77/00855 2339348 |

TABLE X (continued)

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Philip Morris

| | | | | |
|---|----------------------|--|--|--|
| "Apparatus for Supplying Printing Ink"* Thatcher | 06/10/75 PM 649 | 12/16/76 01/07/77 | West German O. France (Appl.) | 2625850 2314056 |
| "CID Perforator"* Spiers | 08/04/76 PM 660 | 02/--/78 | West German O. | 2734716 |
| "Apparatus for Providing Output Indication of Rod Firmness"* Nienow | 12/05/75 PM 663 | 06/16/77 | West German O. | 2654821 |
| "Azetidine Compounds" Edwards et al. | 06/26/75 PM 664-6 | 12/30/76 | West German O. West German O. West German O. | 2628469 2659893 2659892 |
| "Method for Control of Air Relative Humidity"* Knight | 06/25/76 PM 672 | 01/13/78 01/20/78 12/28/77 12/29/77 | Japan Kokai France (Appl.) Netherlands West German O. | 53003598 2356089 77/07043 2728566 |
| "Flavorant Release Resin Compositions"* Grubbs | 10/22/75 PM 687 | 04/28/77 04/26/77 04/28/77 | West German O. Netherlands Japan Kokai | 2647323 76/11619 52052988 |
| "Apparatus for Handling Rod Shaped Articles"* Atwell | 04/12/76 PM 691 | 10/20/77 | West German O. | 2716188 |
| "Variable Parameter Smoking Machine"* Claflin | 11/04/75 PM 693 | 05/12/77 | West German O. | 2650058 |

¹Auslegeschrift²Patentschrift³Offenlegungsschrift

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TABLE XI

*U. S. Equivalent Issued

R. J. REYNOLDS TOBACCO CORPORATION

| Title | Priority Country and Date(s) | Publication or Issue Date | Country of Issue | Issue Number |
|--|------------------------------|--|--|--|
| "Extension Unit for Cigarette Vending Machine" | United States 03/08/76 | 09/12/77 09/22/77 09/06/77 10/07/77 09/03/77 | Netherlands West German O. ¹ Brazil France (Appl.) Sweden | 76/02402 2609581 76/01388 2343749 76/02950 |
| "Tiered Container with Flow Distribution System for Tobacco Expansion" | United States 05/03/76 | 11/07/77 11/17/77 12/20/77 -- -- 11/04/77 12/13/77 11/04/77 04/29/77 04/01/77 12/02/77 | Netherlands West German O. Brazil Belgium South Africa Sweden United States Finland Israel Portugal France (Appl.) | 77/01981 2709651 77/01859 851501 77/00390 77/00748 4062367 77/0241 52532 66448 2350062 |
| "Glucose to Fructose Iso-merizing Enzyme and Preparation" | United States 10/20/76 | 12/30/77 12/06/77 10/01/77 | Israel United States Portugal | 53095 4061539 67162 |
| "Filler Material Including Stalk--Chop + Expand + Rechop" | United States 12/22/75 | 07/22/77 06/23/77 07/11/77 02/28/77 | France (Appl.) West German O. Japan Kokai United States | 2336093 2657550 52082800 4076030 |

TABLE XI (continued)

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Reynolds

| | | | | |
|--|---------------------------|--|---|--|
| "Apparatus for Applying Uniting Bands to Rods" | United States 07/07/76 | 01/16/78 01/01/78 05/03/77 -- 12/22/77 01/20/78 | Spain Netherlands United States South Africa West German U.M. ² Japan Kokai | 456715 77/02224 4020852 77/01223 77/11116 53006500 |
| "Recovery of Condensable Organic Vapors" | United States 09/02/76 | 04/29/77 04/01/77 -- 03/16/78 01/01/78 -- 06/20/78 | Israel Portugal South Africa West German O. Spain Belgium United States | 51533 66449 77/00418 2709650 455705 851502 4095605 |
| "Method and Apparatus for Forming Filters" | United States 01/18/74 | 01/05/78 01/05/78 02/14/78 11/15/77 | Great Britain Great Britain Canada Switzerland | 1496791 1496792 1026185 593029 |
| (Before 1977 in Brazil, West Germany, France, Japan, Netherlands, Sweden, Spain, South Africa) | | | | |
| "Automatic Package Inspection with Conveyor" | United States 12/20/74 | 11/29/77 05/26/77 06/01/77 06/01/77 | Canada Australia Spain Spain | 1021722 75/86811 445245 445246 |
| (Before 1977 in Denmark, Japan (2), France, Netherlands, West Germany, Sweden, Brazil) | | | | |

TABLE XI (continued)

Reynolds

| | | | | |
|---|---------------|----------|------------------|---------|
| "Tobacco Expansion" | United States | 04/18/77 | Denmark | 134501 |
| | 04/28/71 | 02/28/77 | Finland | 52011 |
| (Before 1977 in Italy, Spain, Australia, Switzerland, Great Britain, Austria, Israel, Sweden, Norway, Brazil, Canada, Argentina, West Germany, United States, etc.) | | | | |
| "Filter Element for Cigarette" | United States | 03/29/77 | Canada | 1007536 |
| | 07/09/73 | 04/21/77 | Great Britain | 1470857 |
| | | 04/03/77 | Italy | 1014877 |
| | | 03/31/77 | West German U.M. | 7419672 |
| (Before 1977 in Spain, Denmark, Netherlands, Argentina, South Africa, France, etc.) | | | | |

¹Offenlegungsschrift²Utility Model

PATENTS LISTED BY THE INTERNATIONAL PATENT RESEARCH OFFICE

| | |
|--|---|
| Filter related | German 1931137 Belgium 823543 |
| Smoking materials and/or flavorants | Great Britain 1504103, 1505406, and 1501152 Belgium 827925 Netherlands 154925 |
| Miscellaneous | West German 1532254/recovery mechanism for cigarette rejects |

TABLE XII

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BROWN & WILLIAMSON TOBACCO CORPORATION*
AND BRITISH-AMERICAN TOBACCO COMPANY

| Title | Priority Country and Date(s) | Publication or Issue Date | Country of Issue | Issue Number |
|--|---|---------------------------|-----------------------------|--------------|
| "Filter with Helical Channel for CO Reduction" | Great Britain 03/17/76 | 09/18/77 | Denmark | 77/01148 |
| | | 09/18/77 | Finland | 77/0731 |
| | | 07/18/77 | Belgium | 852574 |
| | | -- | South Africa | 77/01364 |
| | | 09/22/77 | West German O. ¹ | 2711742 |
| | | 09/20/77 | Netherlands | 77/02584 |
| "Manufacture of Grooved Filter Element" | Great Britain 03/17/76 and 12/20/76 | 09/18/77 | Denmark | 77/01149 |
| | | 09/18/77 | Finland | 77/0730 |
| | | 07/18/77 | Belgium | 852575 |
| | | -- | Brazil | 77/01599 |
| | | -- | South Africa | 77/01363 |
| | | 09/22/77 | West German O. | 2711784 |
| | | 09/20/77 | Netherlands | 77/02586 |
| | | 09/24/77 | Japan Kokai | 52114099 |
| "Filter/Activated Charcoal + Ventilated Tipping Paper (also assigned to Cia Souza Cruz Industria)" | Great Britain 12/18/75 | 07/02/77 | Japan Kokai | 52079099 |
| | | 06/21/77 | Netherlands | 76/13432 |
| | | 06/19/77 | Denmark | 76/5686 |
| | | 06/19/77 | Finland | 76/3453 |
| | | 06/30/77 | West German O. | 2654698 |
| | | 04/15/77 | Belgium | 849482 |
| | | -- | Brazil | 76/08510 |
| | | -- | South Africa | 76/06954 |
| | | | | |

*U. S. Priority = Brown & Williamson
Great Britain = British American

TABLE XII (continued)

Brown & Williamson

| | | | | |
|--|---------------------------|----------|----------------|-----------|
| "Manufacture Process/Uncut Block of Tobacco Mixed with Strip" | United States 04/23/76 | -- | Japan Kokai | 52137000 |
| | | -- | France (Appl.) | 2348659 |
| | | -- | Belgium | 853418 |
| | | -- | West German O. | 2717182 |
| "Cigarette with Highly Porous Paper--Electrostatic Perforated--By Laser or Mechanical" (also assigned to Cia Souza Cruz Industria) | Great Britain 10/28/75 | 01/31/77 | Belgium | 846999 |
| | | 05/02/77 | Japan Kokai | 52054099 |
| | | 04/29/77 | Denmark | 76/4850 |
| | | 04/29/77 | Finland | 76/2989 |
| | | 05/05/77 | West German O. | 2644921 |
| | | 05/02/77 | Netherlands | 76/11213 |
| "Tobacco Substitute/Tobacco + Binder, Boron Compound and Inorganic Matter" | United States 11/11/75 | 05/09/78 | United States | 4088142 |
| | | 03/01/77 | Belgium | 848165 |
| | | -- | Netherlands | 76/125549 |
| | | -- | West German O. | 2651538 |
| | | -- | Finland | 76/03197 |
| | | -- | Denmark | 76/5069 |
| | | -- | Brazil | 76/07485 |
| "Sand and Tobacco Separator" | United States 10/20/75 | -- | South Africa | 76/06231 |
| | | 01/31/77 | Belgium | 847328 |
| | | -- | West German O. | 2647363 |
| | | -- | Netherlands | 76/11505 |
| | | -- | Brazil | 76/06340 |
| | | -- | France (Appl.) | 2328515 |
| "Processing Tobacco Stalks and Leaves" (also assigned to Cia Souza Cruz Industria) | Great Britain 08/18/75 | -- | South Africa | 76/05135 |
| | | 03/03/77 | Brazil | 76/05389 |
| | | | West German O. | 2636311 |

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TABLE XII (continued)

Brown & Williamson

| | | | | |
|--|---------------------------|----------|----------------|----------|
| "Apparatus and Production of Porous Wrapping Material" | Great Britain 08/11/75 | 03/24/77 | Japan Kokai | 52038099 |
| | | 02/12/77 | Denmark | 76/3611 |
| | | 02/24/77 | West German O. | 2635526 |
| | | 02/15/77 | Netherlands | 76/08656 |
| | | 02/12/77 | Finland | 76/2127 |
| "Treatment of Fibrillated Fibers for Filters" | Great Britain 07/11/75 | 01/31/77 | Japan Kokai | 52012999 |
| | | 01/13/77 | Netherlands | 76/07560 |
| | | 01/12/77 | Denmark | 76/3109 |
| | | 01/12/77 | Finland | 76/1981 |
| | | 05/25/77 | South Africa | 76/3983 |
| "Apparatus for Dispensing Spaced Deposits of Particulate Material" | United States 07/16/75 | 01/20/77 | West German O. | 2630576 |
| | | 01/31/77 | Japan Kokai | 52013000 |
| | | 01/17/77 | Denmark | 76/0832 |
| | | 01/17/77 | Finland | 76/1357 |
| | | 03/30/77 | South Africa | 76/1586 |
| | | 04/12/77 | United States | 4016830 |
| | | 02/03/77 | West German O. | 2607464 |
| | | 01/18/77 | Netherlands | 76/02412 |
| | | 09/22/77 | Australia | 76/11999 |
| "Cultivation of Micro-organisms for Denicotinization" | United States 11/11/75 | -- | West German O. | 2634187 |
| | | 03/08/77 | United States | 4011141 |
| "Microbial Denicotinization" | United States 11/11/75 | 08/04/77 | West German O. | 2634188 |
| | | | United States | 4038993 |
| | United States 11/11/75 | 05/26/77 | West German O. | 2634186 |
| | | | United States | 4037609 |
| "Carton Blank Assembly" | United States 05/14/76 | -- | Brazil | 77/03034 |
| | | -- | West German O. | 2721507 |
| | | 11/01/77 | United States | 4056047 |

TABLE XII (continued)

| | | | | |
|--|---|----------------------------------|--|--------------------------------|
| Brown & Williamson | | | | |
| "Flexible Packaging" | Great Britain 05/19/76 | 12/08/77 11/22/77 | West German O. Netherlands | 2722621 77/05439 |
| "Apparatus for Shredding and Crimping Tobacco" | United States 04/10/74 and 01/30/75 | 06/10/77 09/02/76 01/04/77 | Great Britain Australia United States | 1475811 75/78707 4000748 |
| (Australia, South Africa) | | | | |
| "Process for Filters with Particulate Material" | United States 02/04/74 | 07/05/77 05/31/77 06/08/77 | Canada Switzerland West German A. ² | 1013227 588220 2504134 |
| (Great Britain, South Africa, Denmark, Finland, Netherlands before 1977) | | | | |
| "Tobacco Leaf Spine Treated with Alkali" | West Germany 12/20/75 | 06/30/77 | West German O. | 2557688 |
| "Continuous Rod Filter Making Apparatus" | West Germany 10/03/67 | -- | West German A. | 1632180 |

¹Offenlegungsschrift²Auslegeschrift

PATENTS LISTED BY THE INTERNATIONAL PATENT RESEARCH OFFICE

| | |
|----------------|--|
| Filter related | German 2209763, 2222289, 2263178, 2504134, 2251903 Swiss 593637, 595785, 586025, 586026, 587027, 587028, 587615, 588220 Canadian 1020037, 1020038, 1004945, 1012025 Belgium 830243, 830354, 827708 Netherlands 154926 Great Britain 1505256 |
|----------------|--|

TABLE XII (continued)

| Brown & Williamson | |
|--------------------|---|
| Tobacco related | Belgium 835218/tobacco substitute West German 2334115/expansion process Swiss 593636/smoking material Great Britain 1475315/smoking material; 1466912 and 1475315/smoking materials West German 1792440/smoking tobacco West German Offen. 2632693/tobacco low in TPM and aldehydes Canada 1010335/deposition of flavorant on tobacco |
| Miscellaneous | German 2313847/sand and tobacco separator Canada 1001265/preprinted cigarette paper registration control; 1020124/cigarette dispensing package West German Offen. 2731288/method and apparatus for material handling |

TABLE XIII

LIGGETT GROUP, INCORPORATED

| Title | Priority Date | Publication or Issue Date | Country of Issue | Issue Number |
|---|-------------------------|---------------------------|-----------------------------|--------------|
| "Apparatus and Method for Sorting Cigarettes" | 04/05/74 (SN 453347) | 02/25/76 | South Africa | 75/1761 |
| | | 12/06/77 | Canada | 1022110 |
| | | 03/25/76 | Australia | 75/79799 |
| | | 02/03/78 | France | 2266467 |
| | | 10/16/75 | West German O. ¹ | 2513504 |
| | | 01/13/77 | West German O. | 2559475 |
| | | 04/29/77 | Switzerland | 587151 |
| | | 10/07/75 | Netherlands | 75/04040 |
| "Tobacco Composition Palladium and Inorganic Nitrate Additives for Tobacco" | 04/05/74 (SN 458355) | 01/26/77 | South Africa | 75/0791 |
| | | 11/18/77 | France | 2266466 |
| | | 10/25/77 | United States | 4055191 |
| | | 08/05/76 | Australia | 75/77841 |
| | | 10/16/75 | West German O. | 2514787 |
| | | 10/07/75 | Netherlands | 75/01757 |
| | | 12/07/77 | Great Britain | 1493971 |
| "Cinnamic Derivatives for Tobacco" | 07/09/74 (SN 486841) | 07/06/76 | Brazil | 75/03578 |
| | | 12/09/77 | France | 2277536 |
| | | 03/31/76 | South Africa | 75/2706 |
| | | 07/19/77 | Philippines | 10611 |
| | | 03/19/76 | Japan Kokai | 51032797 |
| | | 10/11/77 | United States | 4052993 |
| | | 03/16/76 | United States | 3943943 |
| | | 09/16/76 | Australia | 75/80535 |
| | | 01/22/76 | West German O. | 2527228 |
| | | 01/13/76 | Netherlands | 75/07618 |
| | | 12/14/77 | Great Britain | 1494788 |
| | | -- | Belgium | 829542 |

TABLE XIII (continued)

Liggett

| | | | | |
|---|--|--|---|--|
| "Cigarette Transfer Assembly" | 02/28/74 (SN 446926) | 04/02/75 11/16/76 08/18/76 05/27/76 04/29/77 09/08/77 11/18/77 10/31/75 09/01/75 01/28/76 02/07/78 | United States Brazil Great Britain Australia Switzerland West German A. ² France Argentina Netherlands South Africa Canada | 3848852 75/01004 1446157 75/77345 587026 2508354 2262495 203888 75/01116 75/0285 1025745 |
| "Cigarette Transfer from Making Machine to Packaging Machine" | 07/25/74 (SN 491622) | 05/26/76 02/12/76 06/01/77 03/25/76 12/02/75 07/06/76 01/27/76 02/20/76 01/10/78 11/30/77 | South Africa West German O. Great Britain Japan Kokai United States Brazil Netherlands France (App1.) Canada Switzerland | 75/3985 2530008 1475427 51035500 3923146 75/04543 75/08846 2279618 1024034 593185 |
| "Process and Composition" | 10/03/75 (SN 619536) | 05/31/77 11/30/77 | Brazil South Africa | 76/06639 76/5937 |
| "Cigarette Filter and Apparatus for Making" | 03/01/76 (SN 662485 and SN 662624) | 02/01/78 02/01/78 09/05/77 09/15/77 09/02/77 10/18/77 09/03/77 | Spain Spain Netherlands West German O. Finland Brazil France (App1.) | 229844 456380 77/02179 2708873 770623 77/01157 2342671 |

TABLE XIII (continued)

Liggett

| | | | | |
|---|--|--|--|--|
| "Smoking Compositions Zinc Oxide Additive for Tobacco" | 12/03/70 (SN 94949) | 04/27/76 05/24/73 04/04/72 11/07/73 03/13/73 04/11/74 | Canada Brazil Belgium Great Britain United States Switzerland | 987992 71/08004 776125 1336623 3720214 547611 |
| "Tobacco Compositions Comprising Mono-Esters of Mono and Dialkyl Malonates" | 09/24/73 (SN 399981) | 12/15/77 03/26/75 05/24/75 12/17/74 04/03/75 07/29/75 11/17/76 04/18/75 09/13/77 06/26/75 | Switzerland Netherlands South Africa United States West German O. Brazil Great Britain France (Appl.) Canada Australia | 593634 74/12571 74/5528 3854485 2444670 74/07882 1455630 2244414 1017136 74/72765 |
| "Hollow Filter and Method and Apparatus for Making" | 08/27/73 (SN 391834 and SN 391581) | 05/31/77 05/31/77 11/04/75 07/30/75 04/15/77 06/17/76 11/04/77 05/12/76 06/13/75 03/27/75 01/14/75 05/17/77 03/03/75 | Canada Canada Brazil South Africa ('581) Switzerland Australia France Great Britain Argentina West German O. United States United States Netherlands | 1011211 1011212 74/07119 74/4890 586519 74/72698 2242041 1435255 202490 2440821 3860011 4024012 74/11372 |

TABLE XIII (continued)

Liggett

| | | | | |
|--|-------------------------|----------|-----------------------------|----------|
| "Device for Detecting Carbon on Cigarette Filter Tips" | 03/08/73 (SN 339342) | 02/26/75 | South Africa | 74/1291 |
| | | 10/30/76 | Italy | 1007476 |
| | | 02/16/78 | West German P. ³ | 2411231 |
| | | 05/31/76 | Switzerland | 575729 |
| | | 06/25/76 | France | 2220199 |
| | | 06/18/74 | United States | 3818223 |
| | | 11/19/74 | Brazil | 74/01655 |
| | | 07/10/75 | Australia | 74/66422 |
| | | 01/06/77 | Great Britain | 1460523 |
| | | | | |
| "Tobacco Composition Zinc Oxide-Nitrate Additives to Tobacco" | 12/19/73 (SN 426114) | 12/31/75 | South Africa | 74/7967 |
| | | 02/21/78 | Canada | 1026544 |
| | | 06/23/75 | Netherlands | 74/16562 |
| | | 11/06/75 | Australia | 74/76484 |
| | | 07/08/75 | United States | 3893464 |
| | | 11/10/77 | France | 2255022 |
| | | 06/26/75 | West German O. | 2459891 |
| | | 08/03/77 | Great Britain | 1481718 |
| | | 09/02/75 | Brazil | 74/10542 |
| | | | | |
| "Tobacco with Flavor Enhancer Amino Acid + Sugar Reaction Flavors" | 03/07/72 (SN 232526) | 09/15/77 | Switzerland | 591216 |
| | | 02/12/74 | Argentina | 196659 |
| | | 07/02/73 | Belgium | 796346 |
| | | 01/31/74 | Australia | 73/52856 |
| | | 11/18/75 | United States | 3920026 |
| | | 10/13/77 | West German P. | 2310781 |
| | | 10/19/73 | France (Appl.) | 2175469 |
| | | 12/13/74 | Great Britain | 1378112 |
| | | | | |

TABLE XIII (continued)

Liggett

| | | | | |
|--|-------------------------|----------|----------------|----------|
| "Smoking Compositions" | 03/26/73 (SN 344589) | 01/25/77 | Canada | 1004106 |
| | | 11/08/74 | Argentina | 200428 |
| | | 10/30/76 | Italy | 1007479 |
| | | 09/15/77 | Switzerland | 591217 |
| | | 10/10/74 | West German O. | 2414334 |
| | | 11/19/74 | Brazil | 74/02215 |
| | | 03/04/77 | France (Appl.) | 2222962 |
| | | 11/12/75 | Great Britain | 1413271 |
| | | 08/28/75 | Australia | 74/66092 |
| "Method and Apparatus for Determining Moisture Content of Tobacco" | 12/03/71 (SN 204577) | 11/20/74 | Great Britain | 1374717 |
| | | 07/17/75 | West German P. | 2258961 |
| | | 07/27/73 | France | 2164244 |
| | | 10/16/73 | United States | 3766471 |
| | | 09/13/73 | Brazil | 72/08343 |
| | | 06/14/74 | Switzerland | 549963 |
| | | 03/30/73 | Belgium | 792234 |
| | | 02/24/76 | Canada | 984462 |
| | | 10/08/74 | Argentina | 199888 |
| "Tobacco Smoke Filter" | 10/30/75 (SN 627168) | 07/12/77 | United States | 4034765 |
| | | 05/12/77 | West German O. | 2558004 |
| | | 02/23/77 | South Africa | 76/1362 |
| "Automatic Cigarette Feed Machine" | 04/15/70 (SN 28640) | 03/26/74 | United States | 3799324 |
| | | 10/08/74 | Canada | 955873 |
| | | 02/15/73 | Brazil | 71/01575 |
| | | 12/09/76 | West German P. | 2118320 |
| | | 10/11/74 | France | 2086072 |
| "2-Isopropyl-5-Alkyl-2- Hexanal Derivatives Tobacco Flavorants" | 06/16/71 (SN 153900) | 03/16/78 | West German P. | 2229269 |
| | | 12/15/75 | Switzerland | 570125 |
| | | 01/26/73 | France | 2142484 |
| | | 06/26/73 | Brazil | 72/03883 |
| | | 12/17/74 | Canada | 959367 |
| | | 03/14/73 | Argentina | 192793 |
| | | | | |

TABLE XIII (continued)

| | | | | |
|--|-------------------------|--|---|---|
| Liggett | | | | |
| | | 10/02/72 12/05/72 01/24/74 10/02/73 07/30/74 | Belgium United States Australia* United States Great Britain* | 784942 3704714 72/43544 3762423 1361690 |
| *Non-Convention filing | | | | |
| "Apparatus for Compacting Filter Tip Assemblies | 12/28/70 (SN 101802) | 02/11/75 01/30/73 04/23/73 08/04/72 04/20/73 11/04/76 07/14/77 11/28/73 02/13/73 | Canada Brazil Argentina France Italy West German P. West German U.M. ⁴ Great Britain United States | 962546 71/08554 193369 2119438 944410 2164824 7148920 1339159 3715957 |
| "Method for Treating Tobacco with Flavorants in a Pneumatic System" | 11/13/70 (SN 89296) | 07/25/72 07/21/72 02/28/73 04/10/73 04/10/73 | United States France Argentina Italy Brazil | 3678939 2117355 192585 943655 71/06141 |
| "Apparatus for Discharging Particulate Filter Material for Cigarettes" | 02/26/70 (SN 14385) | 12/10/71 11/17/77 09/05/73 | France West German Great Britain | 2083041 2109090 1328837 |

¹Offenlegungsschrift²Auslegeschrift³Patentschrift⁴Utility Model

TABLE XIV

| LORILLARD | | |
|--|-----------------------------|----------|
| Subject | Country | Number |
| Apparatus for opening cartons and packages of cigarettes | France | 2354718 |
| Apparatus for opening cartons and packages of cigarettes | West German O. ¹ | 2716804 |
| Apparatus for opening cartons and packages of cigarettes | Netherlands | 77/03637 |
| Publicity stand for cigarettes | France | 2333310 |

¹Offenlegungsschrift

TABLE XV

| AMERICAN BRANDS | | |
|-----------------------------|-----------------------------|---------|
| Subject | Country | Number |
| Hermetically sealed package | Belgium | 829773 |
| Tobacco expansion | East Germany | 126882 |
| Tobacco expansion | West German O. ¹ | 2637124 |
| Tobacco expansion | France | 2322556 |

¹Offenlegungsschrift